

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

Art Unit 2132

Jun Tian

Confirmation No. 1787

Application No.: 10/035,830

Filed: October 18, 2001

For: CONTENT AUTHENTICATION  
AND RECOVERY USING DIGITAL  
WATERMARKS

VIA ELECTRONIC FILING

Examiner: V. Perungavoor

Date: May 25, 2006

**PRE-APPEAL BRIEF REQUEST FOR REVIEW**

MAIL STOP AF  
COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Appellant requests review of the appealed-from rejection in the above-identified application. No amendment is being filed with this request.

This request is being filed with a Notice of Appeal.

The review is requested for the reason(s) stated on the attached sheets. (No more than five attached pages are provided.)

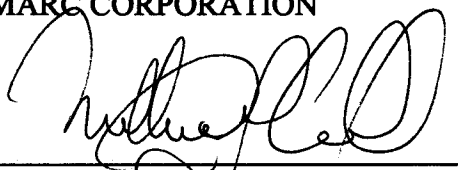
Date: May 25, 2006

Customer Number 23735

Telephone: 503-469-4800

FAX: 503-469-4777

Respectfully submitted,  
DIGIMARC CORPORATION

By 

William Y. Conwell  
Registration No. 31,943  
Attorney of Record

## **REASONS FOR PRE-APPEAL BRIEF REQUEST FOR REVIEW**

The Board will reverse the Examiner. A few reasons for reversal are noted below.

Independent claims 1 and 30 are rejected as anticipated by Kondo. Kondo is somewhat difficult to understand due to its manner of translation into English. However, it is basically understood to disclose a system for encoding a photograph so as to also convey additional information (e.g., a text caption). Kondo also suggests that one-half of an image may be encoded – as additional information - into the other half. A complementary decoder is able to discern the additional information, and is said to be able to return the photograph to its pre-encoded state. (Details of Kondo's operation are set forth in Appellant's December 28 Amendment, at pages 12-14.)

The method of Appellant's independent claim 1 generally relates to arrangements, for example, in which an original image is JPEG-2000 compressed, and the resulting compressed data set is steganographically embedded back into the original image. *See, e.g.*, specification at page 4, line 21 – page 8, line 21.

More particularly, claim 1 requires embedding the first media signal into a second media signal, "*wherein the first media signal is at least a part of the second media signal.*" Kondo does not teach this.

The Action states Kondo teaches "the first data being related to the second data."<sup>1</sup> (Kondo gives the example that an image (first data) may be coded to embed text (second data) related thereto.<sup>2</sup>) However, that is not what the claim requires. The first data "being related" to the second data is a much looser relationship than the "*...is at least a part of* the second media signal" required by the claim. Because Kondo does not teach the claim limitation, the rejection of independent claim 1 will be reversed.

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<sup>1</sup> January 26, 2006, Final Rejection, page 4, paragraph 11.

<sup>2</sup> Kondo, 6,215,421, col. 3, lines 41-42.

(As noted, Kondo mentions an arrangement in which, *e.g.*, a first half of an image is embedded into a second half of the image.<sup>3</sup> The second half of the image – with the first half embedded into it – is said to serve as a compressed form of the image. It will be recognized, however, that this teaching is different than the claimed arrangement, in which there is some overlap between the first and second media signals (*i.e.*, “the first media signal is at least a part of the second media signal”). To effect compression, Kondo would want *no* overlap between the first part of the image and the second part; any such overlap would comprise redundancy, reducing his compression. Thus he speaks of “part” of the image, being embedded into “the remaining” part; and “half of an image” being encoded into “the other half” (*i.e.*, a non-overlapping, complementary relationship). Again, the claim limitation “wherein the first media signal is at least a part of the second media signal” is not met.)

Claim 30 is likewise not anticipated by Kondo. The claim reads:

*30. A method of hiding auxiliary data in a media signal, the method comprising:*  
*dividing the media signal into blocks;*  
*partitioning the media signal into two regions;*  
*for a plurality of the blocks, compressing the media signal from a first region of a block and embedding redundant instances of the compressed media signal of the block into a second region of two or more blocks.*

One implementation falling within the scope of this method is detailed in Appellant’s specification as follows:

*This section describes a method for authenticating a media signal and for restoring regions of the signal when tampering has been detected....*

*The embedder partitions a digital image into two non-overlapping regions. The first region is relatively large compared to the second, and contains most of the perceptually important visual content. The second region is smaller and contains almost no perceptually important visual content.*

*The embedder embeds a hash of the first region into the second region....*

*In one implementation, the embedder divides the image into blocks, then partitions each block into regions (namely, region I and region II). One example partitioning is to separate the most significant bits from the least significant bits (*e.g.*, for an 8 bit per pixel image, region I comprises the 7 most significant bits and region*

<sup>3</sup> Kondo, 6,215,421, col. 7, lines 5-9; col. 17, lines 39-47.

*II comprises the least significant bit. Next, it compresses region I of each block to compute a hash for that block. In particular, it performs a JPEG 2000 compression of region I. It then embeds the compressed bit stream of region I of a block (a source block) into region II of one or more different blocks (the target block(s)) ....<sup>4</sup>*

Kondo does not teach the method of claim 30.

The Action cites Kondo's Fig. 14 for certain acts of the method, but Fig. 14 concerns a method of *recovering* data from an encoded image, rather a method of *hiding* data, as claimed. (Fig. 14 details how bit planes of an image block are arranged in ascending order – based on correlation – thereby decoding Kondo's "additional information" that was represented by earlier shuffling in the order of his bit planes. *See*, in this regard, the review of Kondo's teaching in Appellant's December Amendment, pp. 12-14.)

Moreover, the Action maps the claimed "regions" of claim 30 to Kondo's "bit-planes" (S13 in Fig. 14). But if Kondo is viewed as partitioning the media signal into two "bit plane" regions (per S13 in Fig. 14), he does not teach compressing a media signal from a first "bit-plane" region of a block, and embedding it into a partitioned second "bit-plane" region of a second block.

Regarding the concluding clause of claim 30, the Final Rejection cites Kondo at col. 3, lines 10-34; col. 7, lines 14-30;<sup>5</sup> col. 6, line 65- col. 7, line 29; and col. 8, lines 4-23.<sup>6</sup> However, contrary to the Examiner's assertion, nowhere do these 94 lines of Kondo's specification teach the arrangement required by this claim clause.

The col. 3 excerpt simply recounts that Kondo's encoder 3 codes an image in accordance with "additional information," which is stored on a medium 4, or sent by a channel 5.

The cols. 6 and 7 excerpts note that the encoding of additional information into an image is akin to compression – transferring more information without more overhead. Thus, if one-half of an image is encoded as "additional information" into the other half, compression can be said to result. Additionally, this passage notes how Kondo's encoding exploits energy deviation in the image - allowing more information to be encoded in images that have high

<sup>4</sup> Specification, page 11, line 8 – page 12, line 12.

<sup>5</sup> January 26, 2006, Final Rejection, page 4, paragraph 14.

<sup>6</sup> January 26, 2006, Final Rejection, page 2, paragraph 3.

activity. Unlike MPEG (in which greater compression is achieved with images having less activity), Kondo's method allows more compression to be achieved (*i.e.*, more additional information can be encoded) in images having more activity.

The col. 8 passage gives an encoding heuristic that derives from this property (*i.e.*, that high activity images can convey more additional information than low activity images). This heuristic rule is that - given two pieces of information (image data) - the one with *less* activity should be the "additional information" that is encoded into the piece with *more* activity.

Thus, it can be seen that none of these passages teaches the last clause of claim 30, in which instances of a compressed signal from a first partitioned region, are redundantly embedded into second partitioned regions of two or more blocks.

Independent claim 5 is said to be anticipated by Bhaskaran. Not so. The claim reads:

*5. A method of decoding auxiliary data that has been imperceptibly embedded into a host signal:*

*decoding the auxiliary signal, which represents a compressed version of the host signal;*

*decompressing the compressed version, the decompressed version being perceptually similar to the host signal;*

*using the decompressed version to authenticate the host signal.*

Bhaskaran relates to methods of image authentication in which a digital signature – based on a hash of an image - is calculated, and is encoded into the image. This permits detection of image tampering (*i.e.*, the hash of a suspect image can be computed, and compared to a hash decoded from the image; if the two hashes fail to match, the image has been altered since the time of its encoding).

The Examiner takes the view that the claimed "*compressed version of the host signal*" is met by an image hash (presumably because the hash is derived from the image, and comprises fewer bits). Under this view, the "*decoding...*" clause of the claim is said to be met by Bhaskaran.

However, even under this view, the "*decompressing...*" clause is not met.

Bhaskaran teaches that his hash is a "one-way hash function" (col. 5, lines 40-41). A "one-way hash function" cannot be reversed to obtain the original signal from which the hash

derived – nor anything like it. Thus, Bhaskaran does not teach “decompressing the compressed version” requirement of the claim. And certainly, Bhaskaran’s one-way hash can not be decompressed to yield a version of the host signal “*perceptually similar to the host signal*.”<sup>7</sup>

Claim 10 is an independent claim having numerous particular limitations, which are all summarily dismissed by reference to a single passage of Bhaskaran. On examination, the Board will recognize that numerous aspects of the claim have not been considered by the Examiner, and are certainly not taught by the reference.

Likewise, independent claim 24 spans a half-page of text, and comprises numerous particular limitations. Yet, the four line explanation of the rejection fails to address numerous of the claim’s requirements. Again, Board review will again find the rejection ill-founded.

For brevity’s sake, the foregoing discussion has noted only certain of the claims pending in the application, and only selected points have been reviewed in connection with each. Many other points that might have been raised concerning the claims, the art, and the rejections, have not been belabored.

Nonetheless, the foregoing brief observations are believed sufficient to establish that the outstanding rejections would not be sustained by the Board.

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<sup>7</sup> Regarding the “perceptually similar” requirement, the Examiner cites col. 5, lines 5-9 and 58-61 of Bhaskaran. However, these excerpts relate to embodiments in which the host image is in JPEG-compressed form, and the embedded information is conveyed in the luminance plane of the image data; the excerpt notes that when the compressed representation is converted back to red, green, and blue pixel values (RGB), the resulting distortion is minimized. Such language does not address the claim limitation requiring decompression of embedded auxiliary data – where the decompressed auxiliary data is perceptually similar to the host signal. Bhaskaran’s one-way hash cannot yield anything “*perceptually similar to the host signal*.”